

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

17 DEC 2004

Applicant's or agent's file reference PC/GW/P12895PC		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)
International application No. PCT/GB 03/02613	International filing date ( <i>day/month/year</i> ) 18.06.2003	Priority date ( <i>day/month/year</i> ) 18.06.2002
International Patent Classification (IPC) or both national classification and IPC C23C18/08		
Applicant UNIVERSITY COURT OF THE UNIVERSITY OF DUNDEE		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  08.12.2003	Date of completion of this report  16.11.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Brisson, O  Telephone No. +49 89 2399-8449 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/02613

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, Pages

1-25 as originally filed

### Claims, Numbers

1-40 as originally filed

### Drawings, Sheets

1/14-14/14 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.  
☐ paid additional fees.  
☐ paid additional fees under protest.  
☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.  
☒ not complied with for the following reasons:

**see separate sheet**

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.  
☒ the parts relating to claims Nos. 1-19 .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	1-19
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

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see separate sheet

**Re Item IV**

**Lack of unity of invention**

The subject-matter of independent claims 1 and 17 deals with the formation of a metal deposit on a substrate and the deposit obtainable thereof. The method involves the use of a photosensitive organometallic compound in general. The problem to be solved by the subject-matter of claim 1 and 17 is to provide an alternative to the known method of depositing metal on a substrate by photolysis or reduction heating and which is suitable for nanoscale circuitry.

The subject-matter of independent claim 20 and 29 is a photosensitive organometallic compound and a method for producing it. The problem to be solved by the subject-matter of claim 20 and 29 is to provide an alternative to the known photosensitive organometallic compounds suitable for depositing a metal layer by photolysis and/or reduction heating.

The only technical feature linking the subject-matter of claims 1, 17 and claims 20, 29 is a photosensitive organometallic compound. Such compounds are widely disclosed in the prior art (see for example the documents cited in the search report).

The above analysis shows that a priori no single general inventive concept is linking the subject-matter of claims 1-19 (invention I), and the subject-matter of claims 20-40 (invention II).

The application, hence does not meet the requirements of Unity of Invention as defined in Rule 13(1) & (2) PCT.

Since in response to the invitation to restrict or pay additional fees the applicant has neither restricted nor paid additional fees, the examination of the application under chapter II of the PCT was restricted to the subject-matter of the first invention (claims 1-19).

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

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D1: EP-A-0 493 709 (ABB PATENT GMBH) 8 July 1992 (1992-07-08)  
D2: FR-A-2 643 775 (COTTE MARIE THERESE ;RAMY JEAN PIERRE (FR)) 31  
August 1990 (1990-08-31)

The document D1 is regarded as the closest prior art to the subject-matter of claim 1, and discloses (see references in the search report): a process for the deposition of a gold layer. The process according to D1 can only be distinguished from the teaching of D1 in that after the irradiation of the photosensitive organometallic compound with UV radiation, the irradiated organometallic compound is reduced to form metal deposits adhered to the substrate.

The document D2 discloses the deposition of a precious metal layer by thermal decomposition of an organometallic compound leading to the reduction of the metal and the deposition thereof.

The problem to be solved by the present invention may be regarded as to produce deposit such as substantially continuous thin film or substantially narrow line which is capable of electrical conduction in nanoscale circuits.

A further problem to be solved by the present invention may be regarded as to provide a method for producing deposit suitable for nanoscale circuits such as accurate straight lines of high resolution, and the formation of perfect right angles rather than arcs during integrated circuit manufacture.

The method according to D1 (see column 4, lines 22-47) does not explicitly appear to be suitable for nanoscale integrated circuit manufacture. The use of writing methods for depositing the photosensitive organometallic compound onto the substrate is for example mentioned.

Films with a thickness of more than 0.1 to 0.2  $\mu\text{m}$  can be obtained by the method according to D2 (see abstract). This layer must be thickened by electroless deposition to be suitable for an intended use in HF circuitry and/or applications.

According to the description of the present application, the irradiation of the photosensitive organometallic compound followed by a reduction step lead to the formation of a metal deposit capable of electrical conduction in nanoscale circuits.

Therefore, the method proposed in claim 1 of the present application can be considered as involving an inventive step (Article 33(3) PCT).

The product obtainable thereof, subject-matter of claim 17-19 appears also to involve

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an inventive step since it is explicitly suitable for nanoscale circuitry and/or applications contrary to the deposits obtainable by the methods disclosed in D1 or D2.